



Cooperative Dynamic Simulation Modeling: Middle Rio Grande

Middle Rio Grande Water Assembly

Mid Region Council of Governments

Sandia National Laboratories

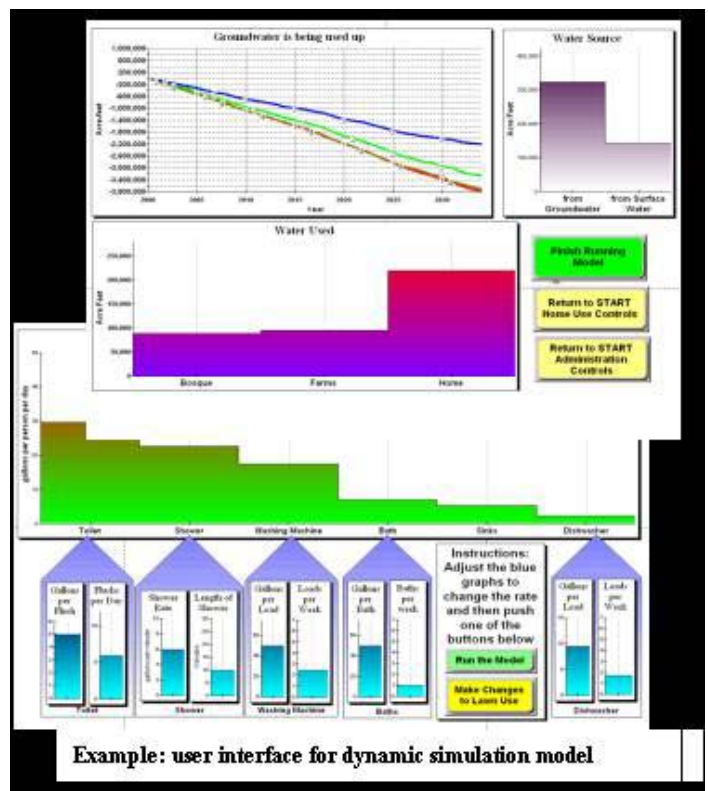
Utton Transboundary Resources Center, University of New Mexico School of Law

Project Description

Computer-based, integrated, dynamic simulation modeling is a powerful tool for supporting long-term, sustainable management of freshwater resources. Scientists at Sandia National Laboratories (SNL) have applied dynamic simulation modeling techniques to a broad suite of water resource issues in China, in the Estancia Basin of NM, and in the Middle Rio Grande Basin. With this background, SNL is applying dynamic simulation modeling to regional water planning efforts in Central New Mexico, in collaboration with the Middle Rio Grande Water Assembly (MRGWA), Mid Region Council of Governments (MRCOG), and the Utton Transboundary Resources Center, using an innovative approach called “cooperative modeling.”

MRGWA is a group of regional, volunteer stakeholders, including municipal water managers, agriculturalists, environmentalists, lawyers, scientists, and others. In partnership with MRCOG they are funded by the NM Interstate Stream Commission to develop a 50-year water use plan for the Middle Rio Grande Planning Region by June, 2003.

The goal of the MRGWA/MRCOG is to produce a community-based water management plan. Toward that end, MRGWA technical groups produced a regional water budget and published it for public review; public outreach groups have held dozens of public meetings, and solicited more than 170 proposed alternatives for regional water planning; those same public outreach groups, with private contractors and MRGWA specialists, work now to prioritize those alternatives and use them to develop sets of alternatives most applicable to the Middle Rio Grande. Those sets of alternatives will comprise the core of the water use plan submitted to the Interstate Stream Commission.



Example: user interface for dynamic simulation model

One of the most difficult tasks before the MRGWA is to quantify the impacts of the various sets of water management alternatives. For example, how much water would be saved if all homes used water saving appliances? **Dynamic simulation modeling can help answer that question, and many others, and can be the centerpiece for community based water planning.**

Another of the most difficult tasks before the MRGWA is to reach consensus and agreement in its diverse membership on what the most applicable management strategies truly are. In an early stage of SNL's involvement with the MRGWA, SNL produced a graphical user interface for a "Water Balancing Exercise" based on data contained in the Water Assemblies "Water Balancing Spreadsheet" which represented a set of 26-year averages of inflow and outflow from the planning basin. This graphical system was used for community outreach through seven Water Assembly sponsored meetings starting in March 2002. Our primary "Cooperative Model" is unrelated to the "Water Balancing Spreadsheet" but instead is based on models developed for the Middle Rio Grande Basin over the last six years at SNL containing one-year time steps, dynamic feedbacks, common datasets with other planning tools, and a user-friendly interface designed for cooperative planning and quantitative assessment of alternatives.

Along with cooperative development of dynamic simulation models, expert facilitation is vital for generating that consensus. Model development in the MRGWA is taking place now with a broad-based team drawn from all the constituency and advocacy groups within the MRGWA, and with legal consultation and facilitation provided by the Utton Transboundary Resources Center. The Utton Center is an organization within the UNM School of Law dedicated to averting and resolving conflicts over transboundary natural resources. The cooperative modeling team, including SNL modelers, Utton Center facilitators, MRCOG administrators, and MRGWA members, meets semi-monthly to study and refine existing model components, to consider how various alternatives should be modeled, to review data for various alternatives, and to build and test model components.

In addition to working within the Water Assembly/Council of Governments structure, we are now meeting with and discussing details of this model with other critical groups who could provide or peer review critical data and assumptions, provide insight into processes at work in the Middle Rio Grande and so forth:

- Middle Rio Grande Conservancy District
- MRGWA Agricultural, Urban and Specialists Constituency Groups
- Representatives from ISC, OSE, Bureau of Reclamation, US Army Corp of Engineers, City of Albuquerque, City of Rio Rancho
- Mid Region Council of Governments
- S.S. Papadopolus & Associates

The cooperative nature of this effort provides a unique and critical advantage that sets this modeling effort apart from all others: it allows members of the modeling team to gain valuable understanding of the data, structure, assumptions, abilities, and limitations of the model. This understanding makes the model a more transparent, more trusted, and therefore a more useful tool in the resource planning process. The understanding gained by the modeling team can be conveyed to the MRGWA at large, making the model a more trusted and useful tool to the entire community. This approach provides a powerful and important link between cutting-edge scientific technology and the public, and it provides a new avenue for community involvement in natural resource management. This same approach can be applied to local, regional and international water resource issues at all scales.

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